

REMARKS

Claims 1-26 are pending in the application and all of the claims have been rejected. Claims 1, 3-4 and 23 have been amended, claim 2 has been cancelled and claims 5-22 and 24-26 remain unamended.

The Examiner rejected claims 1, 5-7, 11 and 13 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,725,204 ("Powell"). Independent claim 1 has been amended to include the limitations of claim 2 to claim "...a sub-atmospheric chamber...having a sub-atmospheric abatement device for conditioning exhaust..." The Examiner asserted that Powell discloses a sub-atmospheric chamber (12), a plurality of high vacuum pumps (14) "connected to plural process vacuum chambers (Reactors #1-#3),...[and] a single outlet (18) from the sub-atmospheric chamber...connected to a backing pump (10)." Office Action, p. 2. However, the Examiner acknowledged that Powell fails to teach that the sub-atmospheric chamber includes an abatement device (*see* Office Action, p. 3) as claimed in amended independent claim 1. In addition, the Examiner indicated that manifold 12 of Powell is a sub-atmospheric chamber as claimed in amended claim 1. Office Action, p. 2. Powell fails to disclose or even suggest that manifold 12 has a sub-atmospheric abatement device for conditioning exhaust as claimed in amended claim 1. Accordingly, Applicants respectfully submit that amended independent claim 1 is not anticipated by Powell and request withdrawal of the rejection to claim 1.

Claims 5-7, 11 and 13 depend from amended independent claim 1. Thus, for at least the foregoing reasons, Applicants respectfully submit that claims 5-7, 11 and 13 are similarly not anticipated by Powell and request withdrawal of the rejections to these claims.

The Examiner rejected claim 16 under 35 U.S.C. § 103(a) as being obvious over Powell. Claim 16, which depends from amended independent claim 1, claims "...a sub-atmospheric chamber...having a sub-atmospheric abatement device for conditioning exhaust..." (amended claim 1) and "four process vacuum chambers and four high-vacuum pumps." The Examiner acknowledged that Powell not only fails to teach that the sub-atmospheric chamber includes an abatement device, but also that Powell fails to teach four process vacuum chambers. Office Action, p. 3. However, the Examiner asserted that "it would have been obvious to one of ordinary skill in the art that additional vacuum chambers...could have been connected to the sub-atmospheric chamber in order to provide additional manufacturing capability." Office Action, p.

3. Applicants respectfully submit that, assuming *arguendo*, even if Powell taught “four process vacuum chambers and four high-vacuum pumps” as claimed in dependent claim 16, Powell fails to teach “...a sub-atmospheric chamber...having a sub-atmospheric abatement device for conditioning exhaust...” as claimed in amended independent claim 1, from which claim 16 depends. Accordingly, Powell does not achieve the invention as claimed in dependent claim 16 thus, Applicants respectfully request withdrawal of the rejection to dependent claim 16.

Claims 2-4, 17, 19-21 and 23-25 have been rejected under 35 U.S.C. § 103(a) as being obvious over Powell in view of U.S. Patent No. 6,635,228 (“Moore et al.”). Notably, claim 23 has been amended merely to place it in proper form. Independent claim 1 claims “...a sub-atmospheric chamber...having a sub-atmospheric abatement device for conditioning exhaust...” Independent claim 17 claims “a single sub-atmospheric abatement chamber; [and] abatement means in the sub-atmospheric abatement chamber.” The Examiner acknowledged that Powell fails to teach that the sub-atmospheric chamber includes an abatement device, but that Moore et al. teach “two vacuum process chambers containing dissimilar gases..., the chamber [sic] being an abatement chamber (12) which conditions different gases from the process vacuum chambers...[and] the abatement device being...[a] plasma ionization device[.]” Office Action, p. 3-4. The Examiner further asserted that “it would have been obvious to one of ordinary skill in the art to combine the dissimilar gas set up of Moore et al. with the vacuum system of Powell for the benefit of precluding problems with mixing incompatible gases.” Applicants respectfully submit that neither amended independent claim 1, independent claim 17, nor independent claim 24 are obvious in view of Powell or Moore et al. either alone or in combination.

As acknowledged by the Examiner, Powell fails to teach a sub-atmospheric chamber having a sub-atmospheric abatement device as claimed in amended independent claim 1, and abatement means in the sub-atmospheric abatement chamber as claimed in independent claim 17. Powell teaches placing abatement equipment (i.e. a scrubber 32) at the exhaust of the central vacuum unit 10, that is, on the *atmospheric* side of the central vacuum unit 10 (FIG. 1; Col. 2 Ln 46-49). Thus, Powell teaches away from placing abatement equipment on the *vacuum* side of the central vacuum unit 10. Moore et al. teach a modular abatement system with multiple inlet modules 26, 34 (FIG. 1) discharging into primary and secondary wet scrubber exhaust modules 12, 20. Moore et al. fails to teach any particular placement of the abatement system in a vacuum processing system. In addition, like Powell, Moore et al. fails to teach or suggest placing the

abatement system under vacuum or placing the abatement system on the vacuum side of a backing pump. Indeed, the device of Moore et al. comprises a scrubber, which is specifically taught by Powell to be placed on the exhaust side of the central vacuum unit 10. Thus, assuming *arguendo*, even if the teachings of Powell and Moore et al. were combined the combination would not achieve the invention as claimed in claims 1 and 17. Powell and Moore et al. teach away from “a backing pump connected to the outlet of the sub-atmospheric abatement chamber[,]” the sub-atmospheric abatement chamber having a sub-atmospheric abatement device as claimed in amended independent claim 1 or a “backing pump connected to the sub-atmospheric abatement chamber for maintaining sub-atmospheric pressure in the sub-atmospheric chamber[,]” the sub-atmospheric abatement chamber having abatement means as claimed in independent claim 17. Thus, in view of the foregoing remarks Applicants respectfully request withdrawal of the rejection to independent claims 1 and 17 as being obvious over Powell in view of Moore et al.

In addition, there is no suggestion or motivation in the cited art to combine the teachings of Powell and Moore et al. The device of Moore et al. would be inoperable at the operating pressures of a turbomolecular pump. For example, water is used throughout the Moore et al. device in various functions. It is the preferred medium used in both the primary scrubber 12 and secondary scrubber tower 18. Col. 8 Ln 62 – Col. 9 Ln. 20. Water is also used in the porous-wall thermal reactor 154 (Col. 19 Ln 54-57), and as a solvent in a dielectric liquid in a falling water plasma reactor 156 (Col. 22 Ln 37-39). Water is impractical for use at pressures on the vacuum side of the backing pump, typically 5-10 torr, because water has a high vapor pressure. Because the Moore et al. device utilizes water in several functions, that device could not be placed in the manifold 12 of Powell without significant modifications. Applicants respectfully submit that neither Powell nor Moore et al. teach such a configuration. Accordingly, for these further reasons, amended independent claim 1 and independent claim 17 are not rendered obvious by Powell or Moore et al. either alone or in combination.

As discussed in the preceding paragraph, there is no suggestion or motivation to combine the teachings of Powell and Moore et al. Assuming *arguendo*, even if the teachings of Powell and Moore et al. were combined, the combination would not achieve the invention as claimed in independent claim 24. Independent claim 24 claims “...conditioning exhaust in the sub-atmospheric abatement chamber using an abatement device.” As discussed above, the Examiner

acknowledged that Powell fails to teach a sub-atmospheric chamber having a sub-atmospheric abatement device. In addition, Powell teaches that the scrubber means 32 is placed on the exhaust side of the central vacuum unit 10. FIG. 1, Col. 2 Ln. 46-49. Indeed, the gas is not conditioned in manifold 12 using an abatement device. Thus, Powell fails to teach or suggest “conditioning exhaust *in* the sub-atmospheric abatement chamber using an abatement device” as claimed in independent claim 24. Emphasis added. Moore et al. teach an abatement system. The system of Moore et al. comprises a scrubber, which is specifically taught by Powell to be placed on the exhaust side of the central vacuum unit 10. Accordingly, even if Powell were combined with Moore et al. the combination would not achieve “conditioning the exhaust *in* the sub-atmospheric abatement chamber using an abatement device” as claimed in independent claim 24. Thus, Applicants respectfully request withdrawal of the rejection to independent claim 24 as being obvious over Powell in view of Moore et al.

Claims 3-4, depend from amended independent claim 1, claims 19-21, 23 depend from independent claim 17, and claim 25 depends from independent claim 24; thus, for at least the foregoing reasons, these claims are also not rendered obvious by Powell or Moore et al. either alone or in combination. Accordingly, Applicants respectfully request withdrawal of the rejections to claims 3-4, 19-21, 23 and 25 as being obvious over Powell in view of Moore et al.

The Examiner rejected claims 8-10, 12 and 18 under 35 U.S.C. § 103(a) as being obvious over Powell in view of U.S. Patent No. 4,636,401 (“Yamazaki et al.”). Dependent claims 8-10 and 12 claim that “the high-vacuum pumps are turbo pumps.” Dependent claim 18 claims that the “pressure control unit comprises a turbo pump.” The Examiner acknowledged that Powell does not teach that the high-vacuum pumps are turbo pumps capable of exhausting to a pressure over 5 torr. Office Action, p. 4. The Examiner, however, asserted that Yamazaki et al. teach a “turbo pump (87) exhausting a process chamber...[t]he turbo pump...[being] capable of exhausting to a pressure over 5 torr and...a throttle valve at the exhaust of the turbo pump.” Office Action, p. 4. In addition, the Examiner asserted that “[i]t would have been obvious to one of ordinary skill in the art to replace the blower (14) of Powell with the pump and valve of Yamazaki et al. for the benefit of preventing contamination of an element in the process chamber.” Office Action, p. 4.

As discussed above, Powell fails to teach or suggest a sub-atmospheric chamber having a sub-atmospheric abatement device as claimed in amended independent claim 1 from which

claims 8-10 and 12 depend, and abatement means in the sub-atmospheric abatement chamber as claimed in independent claim 17 from which claim 18 depends. In addition, Yamazaki et al. teach a system using turbomolecular pumps 86-89 for evacuating individual process and buffer chambers 51A, 51B, 51C, 51P. Yamazaki et al. is an example of a system utilizing separate, individual rotary pumps 34-37 as backing pumps for the turbo pumps 86-89. The turbo pump of Yamazaki et al. is described as capable of exhausting gases even when the pressure of the reaction vessel is 0.01 to 10 torr. Col. 4 Ln. 15-20; Col. 3 Ln. 2-4. However, Yamazaki et al., like Powell, fails to teach or even suggest a sub-atmospheric chamber having a sub-atmospheric abatement device as claimed in amended independent claim 1 from which claims 8-10 and 12 depend, and abatement means in the sub-atmospheric abatement chamber as claimed in independent claim 17 from which claim 18 depends. Thus, even if the teachings of Powell were combined with Yamazaki et al., the combination would not achieve the invention as claimed in claims 8-10, 12 and 18. Accordingly, Applicants respectfully request withdrawal of the rejection of claims 8-10, 12 and 18 as being obvious over Powell in view of Yamazaki et al.

Claims 18 and 26 have been rejected under 35 U.S.C. § 103(a) as being obvious over Powell in view of Moore et al. and in further view of Yamazaki et al. Dependent claim 18 claims that the “pressure control unit comprises a turbo pump connected for evacuating the...processing chamber.” Dependent claim 26 claims that “the intermediate vacuum pressure is between 5 and 10 torr.” The Examiner acknowledged that Powell does not teach that the high-vacuum pumps are turbo pumps. Office Action, p. 5. However, the Examiner asserted that Yamazaki et al. teach a turbo pump capable of exhausting to a pressure of over 5 torr and that there is a throttle valve at the exhaust of the turbo pump. Office Action, p. 5. In addition, the Examiner asserted that “[i]t would have been obvious to one of ordinary skill in the art to replace the blower (14) of Powell with the pump and valve of Yamazaki et al. for the benefit of preventing contamination of an element in the process chamber.” Office Action, p. 5.

As discussed above, with respect to amended independent claim 17 from which claim 18 depends and independent claim 24 from which claim 26 depends, there is no suggestion or motivation to combine Powell with Moore et al. The Examiner alleges that combining the system of Powell with the abatement equipment of Moore et al. would have been obvious to eliminate problems with mixing incompatible gas streams (citing Col. 18 Ln. 27-32). The prior art addressed that problem, however, by providing separate backing pumps (*see* Yamazaki et al.),

and treating the gases at atmospheric pressure. Nowhere in the cited art is there any suggestion to place the abatement equipment on the vacuum side of the backing pump. Powell explicitly teaches the opposite configuration: placing a scrubber on the atmospheric side of the backing pump. Thus, the combination of Powell, Moore et al. and Yamazaki et al. do not achieve abatement means in the sub-atmospheric abatement chamber as claimed in independent claim 17 from which claim 18 depends, or conditioning exhaust *in* the sub-atmospheric abatement chamber using an abatement device as claimed in independent claim 24 from which claim 26 depends. Accordingly, Applicants respectfully request withdrawal of the rejection to dependent claims 18 and 26 as being obvious over Powell in view of Moore et al. and Yamazaki et al.

The Examiner rejected claim 22 under 35 U.S.C. § 103(a) as being obvious over Powell in view of Moore et al. and in further view of U.S. Publication No. 2005/00394525 (“Olander et al.”). Dependent claim 22 claims that “each of the vacuum processing chambers is located within a clean room, and the sub-atmospheric abatement chamber is located outside the clean room.” The Examiner acknowledged that neither Powell nor Moore et al. teach that the vacuum process chambers are located within a clean room and the sub-atmospheric chamber is located outside the clean room. Office Action, p. 5. The Examiner asserted that Olander et al. teach “locating the processing chambers within a clean room (abstract) and an abatement chamber located outside the clean room...[thus,] it would have been obvious to one of ordinary skill in the art to combine the clean room and abatement arrangement of Olander et al. with the vacuum apparatus of Powell in view of Moore et al. for the benefit of an economically beneficial system.” Office Action, p. 5.

As discussed above with respect to independent claim 17, there is no suggestion or motivation to combine Powell with Moore et al., and assuming *arguendo*, even if Powell were combined with Moore et al., the combination would not achieve abatement means in the sub-atmospheric abatement chamber as claimed in independent claim 17 from which claim 22 depends. In addition, the system of Moore et al. comprises a scrubber, which is specifically taught by Powell to be placed on the exhaust side of the central vacuum unit 10. Thus, Powell and Moore et al. teach away from abatement means in the sub-atmospheric abatement chamber as claimed in independent claim 17 from which claim 22 depends. Thus, the teachings of Powell, Moore et al. and Olander et al., either alone or in combination, do not render dependent claim 22 obvious.

Claims 1-26 have been rejected on the ground of nonstatutory obviousness-type double-patenting as being unpatentable over claims 1 and 4-25 of U.S. Patent No. 7,021,903 ("the '903" patent). The Examiner asserted that "the conflicting claims are *not identical*..." but that the claims "are not patentably distinct from each other because the claims of the instant invention are broader than the claims set forth in the Patent." Office Action, p. 6. The Examiner further asserted that "the claims of the patent include the additional limitation of the abatement device being capable of handling different gasses and then mixing the gasses" and that "an artisan making the invention set forth in the Patent would also be making the invention set forth in the instant application should the application issue as a patent." Office Action, p. 6. Applicant traverses this rejection.

Notwithstanding the assertion of the Examiner to the contrary, the presently rejected claims 1-26 are directed to and claim different subject matter than the claims of the '903 patent. More specifically, in contrast to the claims of the present application, independent claim 1 of the '903 patent claims "at least two process vacuum chambers containing dissimilar gasses...; [and] the sub-atmospheric abatement chamber containing at least one pre-conditioner for conditioning at least one of the received gasses from the process vacuum chambers differently from another of the gasses, whereby the gasses are made compatible for mixing." Independent claim 14 of the '903 patent claims "said abatement means being arranged to treat exhaust from at least one of said process chambers differently from another of said process chambers, whereby the exhausts are made compatible with each other." Similarly, independent claim 23 of the '903 patent claims "[a] method for exhausting gasses from a plurality of process vacuum chambers, the exhaust gasses from at least two of the process vacuum chambers being incompatible with each other...[;] preconditioning the exhaust gasses from at least one of the at least two process vacuum chambers having incompatible gasses, whereby the incompatible gasses are rendered compatible." In support of this rejection, the Examiner asserts that the present claims are broader than the claims of the patent. Applicant respectfully submits that it is irrelevant whether one claim or set of claims is broader than or dominates the claims of the cited patent in determining whether a non-statutory obviousness-type double patenting rejection is proper. The Examiner does not provide any other rationale in support of this rejection other than that "it would have been obvious to one of ordinary skill...to use an abatement device which handles vacuum chambers having the same gas in order to simplify the system." Office Action, p. 6-7.

Applicants respectfully submit that the claims of the later filed '903 patent which was filed as a CIP of the presently pending application are directed to a patentably distinct invention from the claims of the earlier filed parent application and vice versa. In addition, the delay in the prosecution of the present application was not due to Applicants actions.

Applicants have, nonetheless, filed a terminal disclaimer under 37 C.F.R. § 1.321(c) to overcome the double-patenting rejection of claims 1-26 in the event that the double patenting rejection is not withdrawn.

In view of the foregoing amendments and remarks, Applicants respectfully submit that claims 1 and 3-26 are neither anticipated nor rendered obvious by Powell, Moore et al., Yamazaki et al. or Olander et al. either alone or in combination. Accordingly, Applicants respectfully submit that claims 1 and 3-26 are in condition for allowance and that the application be allowed and promptly passed to issue.

Respectfully submitted,



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March 19, 2007

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